

Climatological Data for July, 1909.

DISTRICT No. 2, SOUTH ATLANTIC AND EAST GULF STATES.

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INTRODUCTION.

The territory embraced by District No. 2 includes the larger portion of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama and the eastern portion of the State of Mississippi, or in general terms the eastern and southern slopes of the Appalachian mountain system. The land inclines gradually upward from the coasts of the Atlantic Ocean and the Gulf of Mexico to the mountainous districts of the interior, where the greatest altitudes in the United States east of the Rocky Mountains are found. The great rivers of this section, the James, the Roanoke, the Santee, and the Savannah, which flow into the Atlantic, and the Apalachicola and Mobile, flowing into the Gulf of Mexico, receive their headwaters in the highlands at altitudes ranging from 800 to over 5,000 feet above sea level and possess many important water powers. In every State in the district except Mississippi and Florida the highest altitudes exceed several thousand feet. As a matter of general interest the highest point in each State is presented in the following table:

	Feet.
Virginia, Mount Rogers.....	5,718
North Carolina, Mount Mitchell.....	6,711
South Carolina, Sassafras Mountain.....	3,548
Georgia, Brasstown Bald Mountain.....	4,768
Alabama, Cheaha Mountain.....	2,407
Florida, near Mount Pleasant Station.....	301
Mississippi, near Holly Springs.....	602

The largest rivers in the district with their most important affluents, beginning at the northern limit, are as follows: In Virginia the James River; in North Carolina the Cape Fear and the Roanoke; and in the western portion of the State the headwaters of the Pedee and Catawba which flow into the Atlantic through South Carolina; the chief stream in South Carolina is the Santee formed by the junction of the Broad and Saluda; its main affluent is the Catawba. The Savannah River forms throughout the greater part of its length the dividing line between South Carolina and Georgia. The Altamaha, formed by the union of the Oconee and Ocmulgee Rivers flows into the Atlantic just north of the Florida boundary line. The important streams flowing into the Gulf of Mexico are the Apalachicola River, formed by the junction of the Flint and Chattahoochee, and in Alabama the Mobile River, with its two largest tributaries the Tombigbee and Alabama.

The headwaters of navigation of these important rivers are usually found at what is geologically known as the "fall line", where the rivers break through a low barrier of crystalline rock forming the limit of the Piedmont Plateau to enter the alluvial plains of the coastal region. Beginning at Richmond, Va., the "fall line" passes through Weldon on the Roanoke, near Fayetteville on the Cape Fear, south of Columbia, S. C., on the Santee, through Augusta, Ga. (Savannah), Macon (Ocmulgee), and Columbus, Ga. (Chattahoochee), thence in a westerly direction nearly to Montgomery, Ala., where the southern fall line terminates.

The ridge dividing the waters of the Gulf of Mexico from those of the Atlantic slope enters the State of Georgia from North Carolina at the boundary line between Rabun and Towns counties, passes through Mount Airy, Habersham County, thence along the line of the Southern Railway through Norcross and Stone Mountain to Atlanta, the drainage of this city passing partly into the Atlantic and partly into the Gulf of Mexico. From Atlanta the ridge passes south to Culloden and Fort Valley, thence in a southeasterly direction through Okefenokee swamp, between the St. Marys and the Suwanee basins into Florida. The dividing line between the rivers draining east and

south, and those flowing northward into the Ohio River is formed by the crest of the Blue Ridge Mountains, that is the eastern rather than the western of the chains forming together the Appalachian system.

The limits of district No. 2 are included between Key West, Fla., whose latitude is $24^{\circ} 34' N.$ and Hot Springs, Va., latitude $38^{\circ} 0' N.$; and between Hatteras at the eastern extremity of North Carolina, longitude $75^{\circ} 40' W.$, and Magnolia, Miss., longitude $90^{\circ} 27' W.$ Over such an extended region possessing so varied a topography, great variations must appear in the chief climatic elements, temperature and rainfall, owing both to the effect of latitude and the far more powerful influence of altitude as well as to local conditions. In southern Florida frost never occurs, while in the mountainous districts of the north the winter temperature sometimes falls to 20° or more below zero. The altitudes of the highest meteorological stations in this district are Hot Springs, Va., 2,195 feet and Clayton, Ga., 2,100 feet.

METEOROLOGICAL SUMMARY FOR JULY, 1909.

Although the summer rains in the region under consideration are always convectional and local in character, the occurrence of precipitation is nevertheless controlled by the ill-defined pressure distribution characteristic of the warm season. The excessive rainfall this month in Florida, especially on the west coast where three stations reported amounts exceeding 20 inches was largely caused by the persistence of moderate barometric depressions in northern Florida and southern Georgia from July 1 to 3. The depression appeared first in the vicinity of Tampa, Fla., on June 29 (Tampa, 29.76), moved slowly to southern Georgia July 1 (Thomasville, 29.78) inches, thence to the vicinity of Charleston, S. C., where the lowest pressure for the month, 29.63 inches was recorded on July 3, on which date the minimum pressure was recorded at all stations in the district except at Jacksonville. After a brief period of somewhat higher pressure accompanied by fair weather a second moderate depression appeared on the south Atlantic coast between Norfolk and Charleston on July 7, and during the few days following ill-defined depressions persisted in the Southern States, causing a second period of heavy rainfall from July 7 to 9. The first marked area of high pressure that caused a decided lowering of the temperature in the eastern and northern portions of the district appeared in the Northwest July 19 when the barometer rose above 30.30 inches from Chicago to Marquette. During July 20 and 21 this high area spread southeastward, and on the morning of July 21 extended from Jacksonville to Portland Me. with the pressure over 30.20 inches. The maximum barometer for the month, 30.30 inches, was reported July 20 at Charlotte, N. C. The pressure remained above normal throughout the district from July 23 to the close of the month, most of the Alabama stations reporting the maximum pressure on July 29. A marked peculiarity of the weather for the month was the persistence of showers throughout the period of high barometer.

TEMPERATURE.

The temperature during the month was below the normal over the greater portion of the district, including all of Virginia, North and South Carolina, Georgia, most of Florida, and the northeastern half of Alabama. The greatest deficiencies occurred in western Virginia and western North Carolina, and in northern Georgia where they exceeded 4° at a few stations. The temperature was above normal in Mississippi and in southwestern Alabama, and at a few scattered stations in Florida. The greatest excess, however, was only a little over 2° at Mobile, Ala. The monthly mean temperatures ranged from 66.0° at

Hot Springs, Va., to 83.4 at Biloxi, Miss. In Georgia the State mean temperature was the lowest since the records were begun in 1892 except for July 1894 and 1906, while on the other hand in Mississippi the State mean was higher than for any other July since 1902. The comparatively small range in monthly mean temperatures in both Mississippi and Florida (only 4°) is noteworthy as compared with ranges exceeding 10° in Georgia, North Carolina, and Virginia and even 15° in South Carolina. Although the maximum temperature for July slightly exceeded 100° in all portions of the district except Virginia and North Carolina, the number of stations reporting over 100° was less than usual, and the month may be recorded as cool and showery in all the States bordering the Atlantic, from Florida to Virginia. The maximum temperature was 104° at Florence, S. C., and the minimum was 40° on July 10 at Hot Springs, Va.

PRECIPITATION.

The precipitation was very irregularly distributed throughout the district and was below normal at so many stations in each State except Florida that the state averages show a general deficiency that was greatest in Virginia and Mississippi. The most remarkable feature of the distribution was of rainfall the unusually large amount in Florida. The average rainfall for that State, as determined from the records of 60 stations was 11.25 inches, or 4.08 inches above the normal. The greatest amounts fell in the central and northern counties of the peninsula and ranged from 10 to more than 20 inches. The total amount for July, 1909, exceeded 20 inches at the following stations: Cedar Keys, Levy Co., 25.57 inches; Inverness, Citrus Co., 22.57 inches; and Rockwell, Marion Co., 26.00 inches. Excessive rains (2.50 inches or more in 24 hours) occurred at 33 stations in Florida, among which the most remarkable were:—Rockwell, 12.00 inches on the 2, and on the same date New Smyrna, 8.80 inches and Iverness, 8.40 inches. The average number of days with rain in Florida was fifteen.

Smaller areas of heavy rainfall (monthly totals of 8 to 10 or more inches) also appear in the eastern and western portions of North Carolina (greatest amount 14.20 at Greenville, Pitt Co.); in the northern portion of South Carolina as well as at a few stations near the coast; in central Georgia and in small portions of the south-central and southwest sections; in southern Alabama and Mississippi.

Marked deficiencies in rainfall occurred in Virginia and Mississippi. At Richmond the rainfall was the smallest ever received in July. In Mississippi the average precipitation for the State was the least recorded since 1896, several stations

receiving less than two inches during the month. There were deficiencies in precipitation also in central-western Alabama, eastern and northern Georgia, and in central South Carolina, in all of which sections generally less than four inches was recorded. The smallest amounts were Charlottesville, Va., 0.54 inch, and Talladega, Ala., 0.79 inch. There was not a day on which rain did not fall at some point in every State except Virginia (and in Mississippi the 25th), though in many cases the successive amounts were quite small. Longer periods of fair weather were experienced in Virginia than any in other section. The number of days with appreciable rainfall averaged from 8 to 10 in the majority of states. The number of thunderstorms recorded was very large but all were of moderate force.

RIVER CONDITIONS.

Owing to prevailing high temperatures that caused rapid evaporation, to the irregular distribution of rainfall, and to the cultivated condition of the ground, the chief factors diminishing the runoff, there were no floods in any of the rivers of the district, though many of the smaller upper tributaries were much swollen by heavy rains, as well as the smaller unimportant streams in central-western Florida. The upper portion of the Saluda River in South Carolina and its affluents rose slightly above flood stages on July 10, Chappells reporting a maximum stage of 16.9 feet, or 2.9 feet above the flood stage. Subsequently the Santee rose about one foot above the flood stages at Ferguson and Rimini, S. C. Elsewhere the rivers maintained an average flow somewhat below the normal in Virginia, North Carolina, and Mississippi, and slightly above the normal in other states, but not approaching flood stages.

MISCELLANEOUS PHENOMENA.

In Alabama the prevailing wind was from the east, in Mississippi from the south; elsewhere in the district the prevailing winds were from the southwest, usually with moderate velocities. Jacksonville, Fla., on July 18, reported a maximum velocity of 55 miles an hour from the southwest; at Sand Key, Fla., on the 17th a maximum velocity of 52 miles from the southeast was experienced; at Atlanta on the 7th, 48 miles from the west. Despite the frequency of rains there was fairly abundant sunshine over most districts except central Florida. The number of clear days progressively diminished from Virginia (State average 17 days) southward to Florida (average only 9) and thence increased westward to Mississippi (average 14). Very few severe local storms and almost no hail occurred during July, 1909.

